

FIG. 1
(Prior Art)

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```
<xml>  
<button id="btn1" text="This is a line of  
Text" />  
</xml>
```

142

button: Object

144

id: String = "btn1"
text: String = "This is a line of
Text"

```
<xml>  
<button id="btn1" bgcolor="gray" />  
</xml>
```

146

button: Object

148

id: String = "btn1"
bgcolor: Color = Color.gray

button: Object

154

id: String = "btn1"
text: String = "This is a line of
Text"

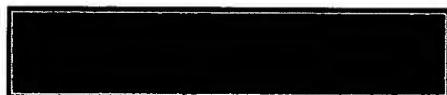
This is a line of Text

150

button: Object

156

id: String = "btn1"
bgcolor: Color = Color.gray



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*FIG. 1A
(Prior Art)*

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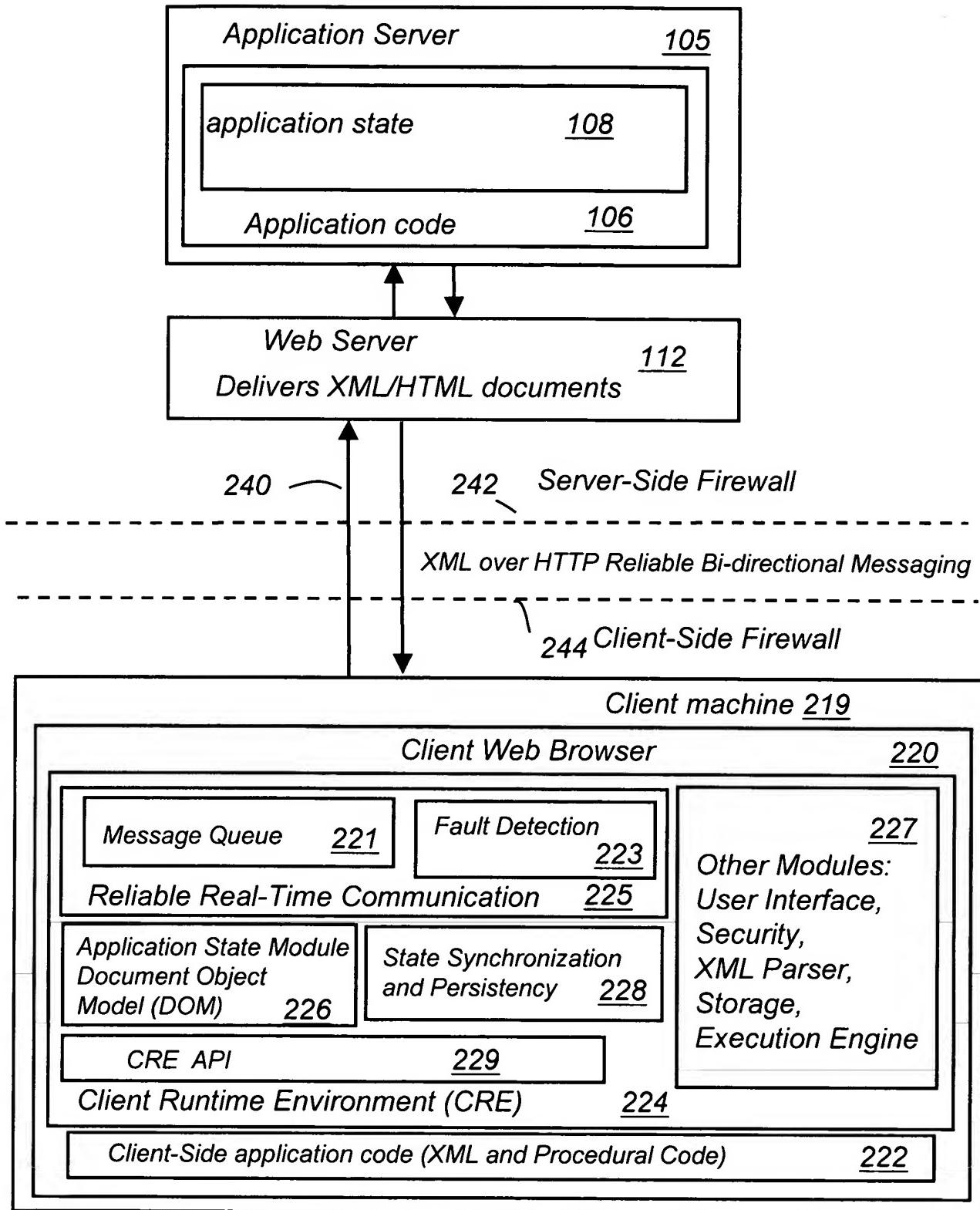


FIG. 2

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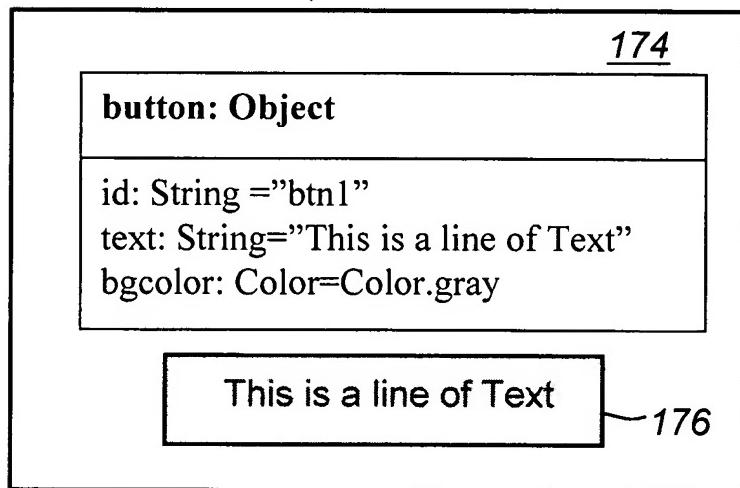
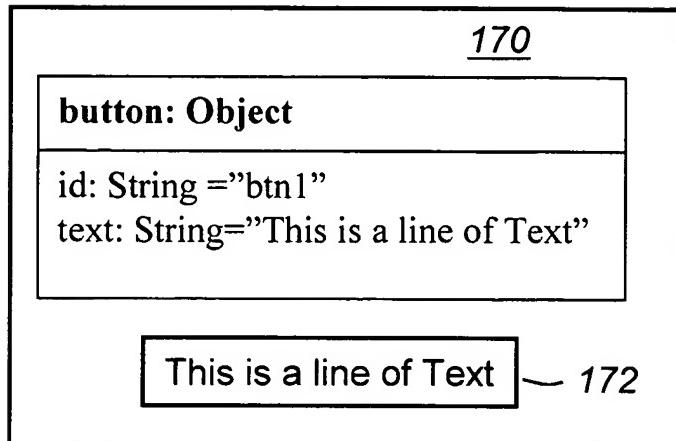


FIG. 2A

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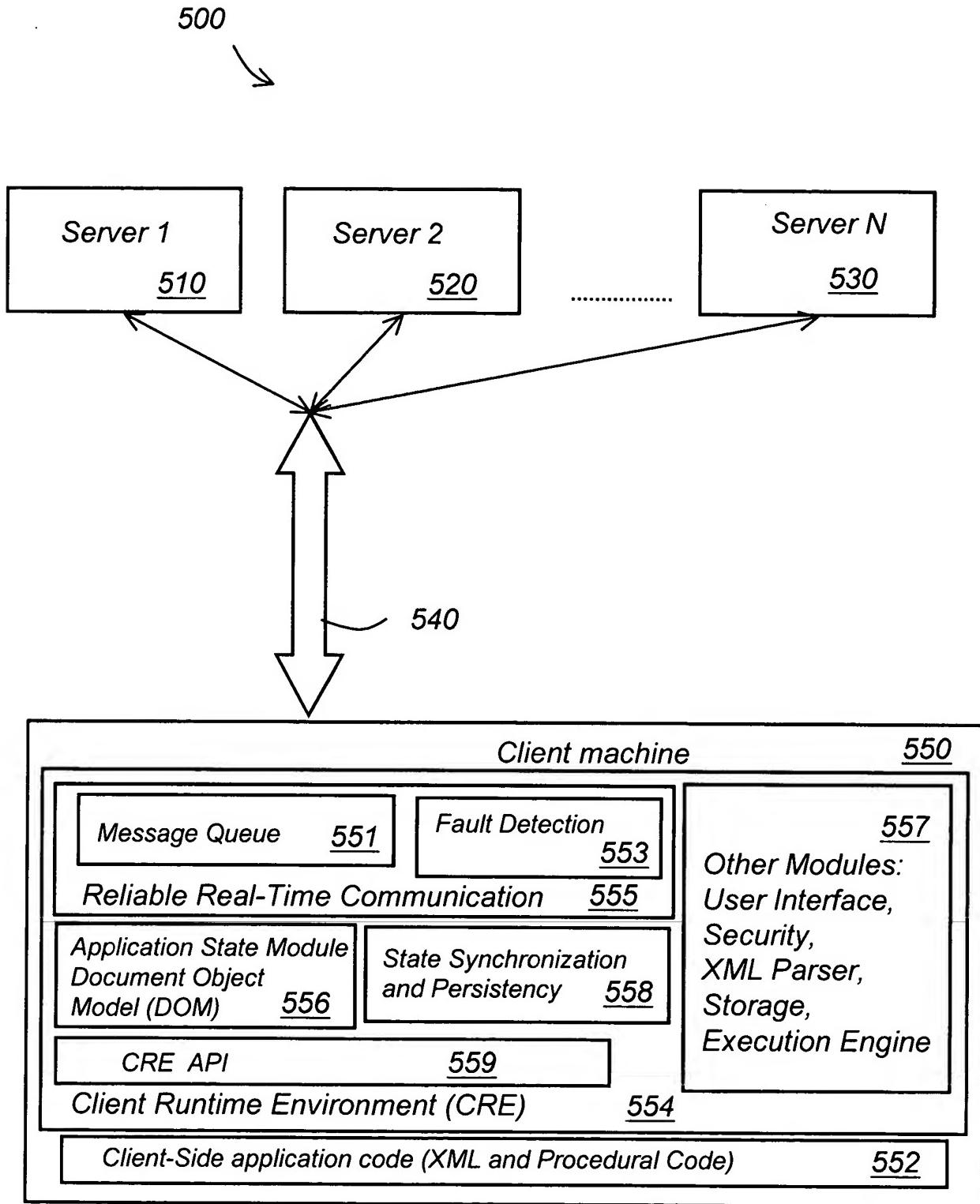
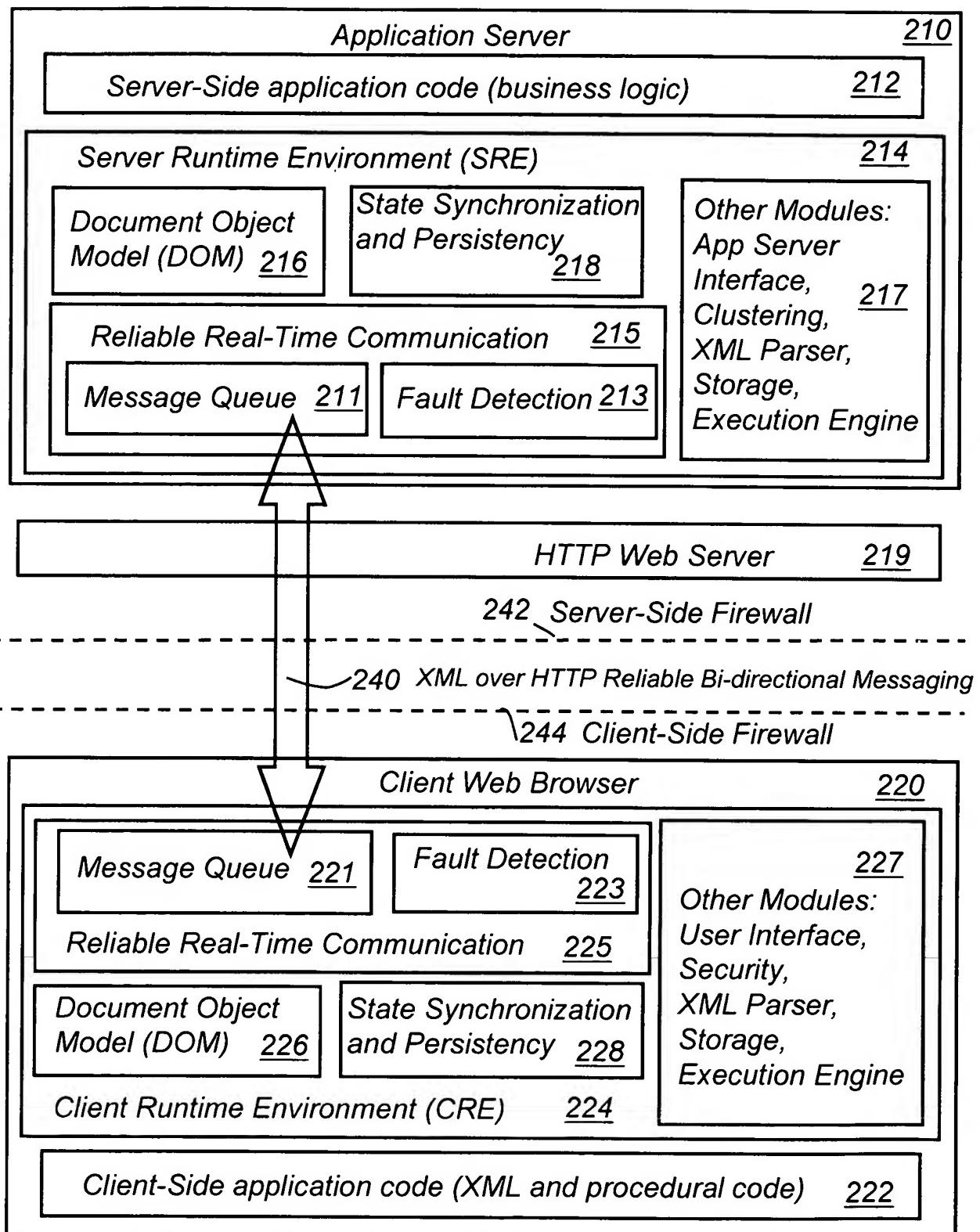


FIG. 3

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HTTP Web Server (219)

242 Server-Side Firewall

240 XML over HTTP Reliable Bi-directional Messaging

244 Client-Side Firewall

Client Web Browser (220)

Message Queue (221)**Fault Detection** (223)**Reliable Real-Time Communication** (225)**Document Object Model (DOM)** (226)**State Synchronization and Persistency** (228)**Client Runtime Environment (CRE)** (224)**Other Modules:** User Interface, Security, XML Parser, Storage, Execution Engine (227)**Client-Side application code (XML and procedural code)** (222)

FIG. 4

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User wants to run an application through a client Machine; CRE sends a request to the application server to retrieve a first XML screen of the application

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Application server sends back to the CRE the first XML screen of the application

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CRE receives the first XML screen, parses it, constructs a first object oriented representation of the information contained in the first screen, stores it in a client side DOM, and displays the first XML screen to the user

330

Application runs in the client machine

340

Upon a user event CRE sends a second request to the application server to retrieve a second XML screen of the application

360

CRE receives the second XML screen, parses it, constructs a second object oriented representation of the information contained in the second screen and stores it in the client side DOM

370

CRE merges the first object oriented representation with the second object oriented representation and displays the combined result to the user

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FIG. 5A

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User wants to run an application through a client machine. CRE sends a request to the application server to retrieve a first XML screen of the application 310

Application server sends back to the CRE the first XML screen of the application 320

CRE receives the first XML screen, parses it, constructs a first object oriented representation of the information contained in the first screen, stores it in a client side DOM, and displays the first XML screen to the user 330

Application runs in the client machine 340

Upon a user event CRE sends a second request to the application server to retrieve a second XML screen of the application 360

CRE receives the second XML screen, parses it, and constructs a second object oriented representation of the information contained in the second screen and stores it in the client side DOM 370

CRE merges the first object oriented representation with the second object oriented representation and displays the combined result to the user 380

Application state is also maintained in a server-side DOM; SRE updates server-side DOM though server-side business logic. 390

Synchronization between client-side DOM and server-side DOM through bidirectional communication 395

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Enter New Order

Customer Information

Billing Address

First Name*	Last Name*		
Billing Address 1*			
Billing Address 2			
Billing City*			
Billing State*	Zip*	Country*	USA

Shipping address is the same as billing address

Customer Look up

Shipping Address

First Name	Last Name		
Shipping Address 1			
Shipping Address 2			
Shipping City			
Shipping State	Zip	Country	USA

Order Entry Form

Product Item Unit Price Quantity

Add item

Line Items

Remove Item	ItemID	Description	Quantity	Unit Price	SubTotal
4					

Credit Card Information

Card Holder Name*	Card Type*	Card Number*	Expiration Date(MM/YYYY)*
2003			

Submit Reset

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FIG. 6A

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600B



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Customer Information

First Name*	Mike	Last Name*	Adam
Billing Address 1*	105 Main Street		
Billing Address 2.			
Billing City*	Cambridge		
Billing State*	MA	Zip*	02138
Country*	USA		
<input type="checkbox"/> Shipping address is the same as billing address			

Customer Look up: Mike Adam

First Name	Mike	Last Name	Adam
Shipping Address 1	105 Main Street		
Shipping Address 2			
Shipping City	Cambridge		
Shipping State	MA	Zip	02138
Country	USA		

Order Entry Form

Product	Item	Unit Price	Quantity	Add item

Line Items

Remove Item	ItemID	Description	Quantity	Unit Price	SubTotal

Credit Card Information

Card Holder Name*	Card Type*	Card Number*	Expiration Date(MM/YYYY)*
Mike Adam			2003

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Submit Reset

FIG. 6B

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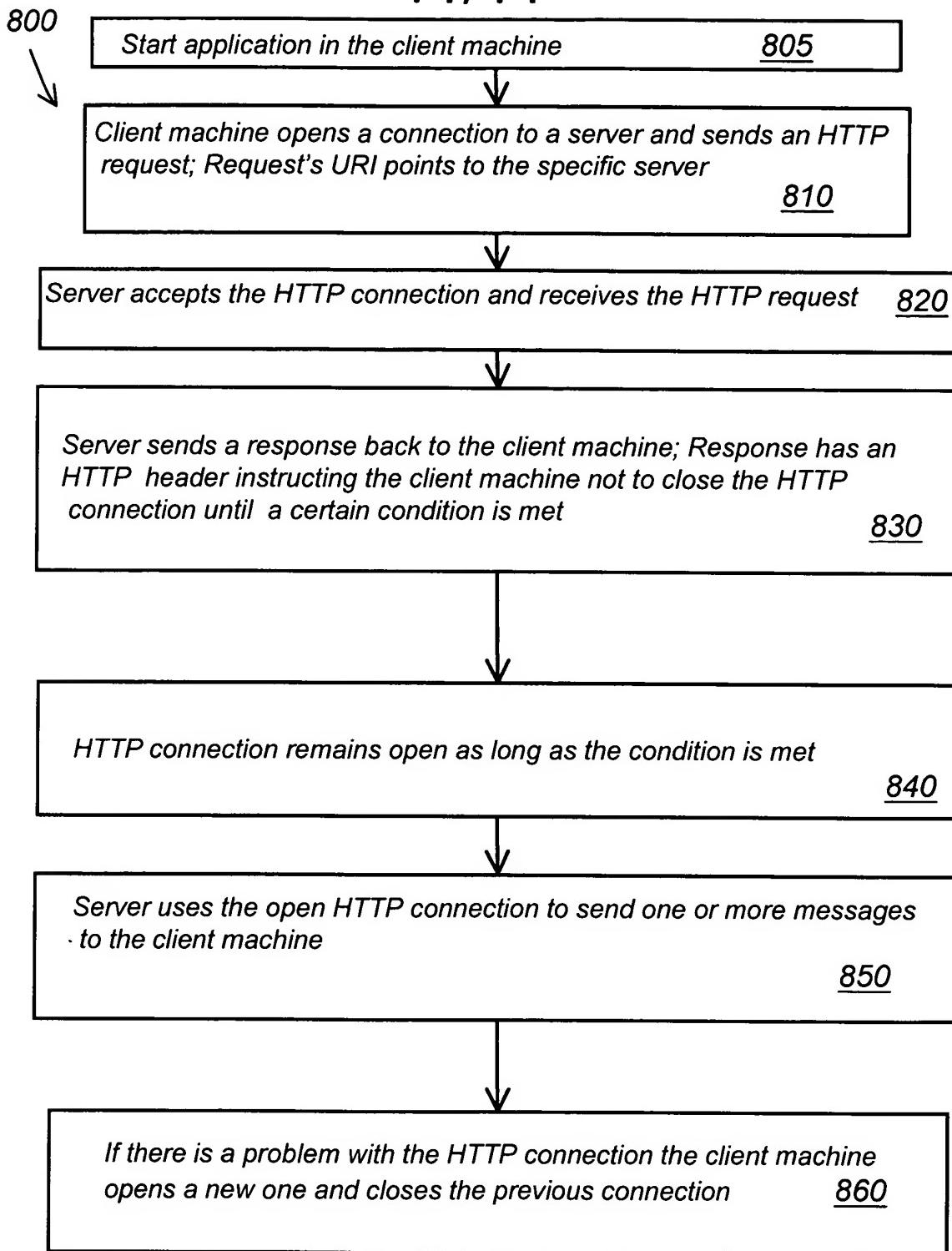


FIG. 7